



**ELECTROSTATIC  
PRECIPITATOR**



## **ELEX – Excellent industrial gas cleaning since 1934**

ELEX is the globally recognised leader for the cleaning of industrial gases and recovery of reusable materials. Since 1934, more than 7,000 units have been installed worldwide, each designed to focus on specific customer needs. Depending on stated requirements, units are either completely manufactured by ELEX or, within the parameters of project-related cooperation agreements, as new units or extensions to existing plants.

World-renowned ELEX engineering has always been committed to highly innovative technology and to the reliability and longevity of its products. This balance guarantees outstanding cleaning of industrial gases across many decades. Unrivalled in quality, ELEX remains innovative, at the very least, for the next 7,000 units.

## **To us, quality means our customers can forget about us**

Quality to us means not only perfect technology and reliable and durable products, but also the best possible service in all phases.

During the planning stage, we listen carefully and ask pertinent questions to present the customer with the best possible solution in the shortest time-frame and with the least effort on the customer's part. Our Swiss reliability ensures that everything will be carried out to your utmost satisfaction. Deadlines and costs will be adhered to, while the effects on your operations until handover of the plant will remain minimal.

Once a plant has been installed and the technical staff instructed by our engineers, our customers rarely need our support. You will have the same experience. However, should you need our help, for instance, for longer maintenance, upgrading with new components, or advice on plant modernisation, we will of course be at your service.

## ELEX Electrostatic Precipitators

Electrostatic precipitators with their countless areas of application remain the most economical system for the removal of dust from industrial gases. Operating costs are reduced due to low energy consumption, and the cost of maintenance and spare parts is very low. In addition, the life expectancy of an electrostatic precipitator usually exceeds that of the upstream production units, such as kilns, mills, driers and coolers.

ELEX electrostatic precipitators are capable of reducing dust content of more than 1,000 g/m<sup>3</sup> to any required residual dust content. More than 6,000 units installed worldwide since 1934 are proof of their efficiency and durability. The continuous and further development of all precipitator components using the most advanced technologies and the analysis and evaluation of measured results under various operating conditions have provided an immense pool of experience. When choosing on an ELEX installation, customers benefit from unrivalled know-how.

### The typical applications for electrostatic precipitators are:

- › Production plants for cement, limestone and gypsum (kilns, mills, dryers and coolers)
- › Coal- and biomass-fired steam boilers
- › Refuse and sludge incinerators
- › Iron and steel production (ore processing, blast furnaces, converters)
- › Production plants in the non-ferrous metal industry
- › Production plants in the pulp and paper industry



**IRON INDUSTRY, Brazil**  
**IRON ORE PELLETISATION**



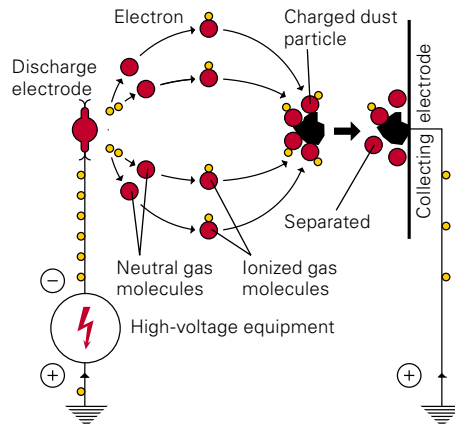
**CEMENT WORKS, Germany**  
**CLINKER COOLER**



## The ELEX method of operation: Lowest emissions with highest cost-effectiveness

Electrons are emitted from discharge electrodes which have been charged with a rectified negative high voltage. These electrons migrate to the collecting electrodes. As the electrons accumulate on the dust particles, the latter become negatively charged. The electric field transports them to the earthed collecting electrodes where they are deposited.

In the ELEX electrostatic precipitator, the collecting electrodes consist of profiled plates. These form a system of passages through which the exhaust gas flows. The robust ELEX discharge electrodes, known as the "RS" type, are arranged along the central axis of the 400 mm-wide passages. Mechanical rapping equipment cleans the collecting electrodes by means of periodic rapping. The robust RS electrodes and the maintenance-friendly design are only two of the ELEX electrostatic precipitator's main characteristics.



**The principle of the electrostatic precipitator is a well-proven technology. ELEX electrostatic precipitators are the ultimate choice thanks to uncompromising continuous development.**

## Efficiency and durability thanks to optimal dimensioning

ELEX plants should be neither over- nor under-dimensioned, but tailor-made to suit customer needs. They will therefore operate at the best cost-benefit ratio, which is ensured by reliable calculations based on many years of experience.

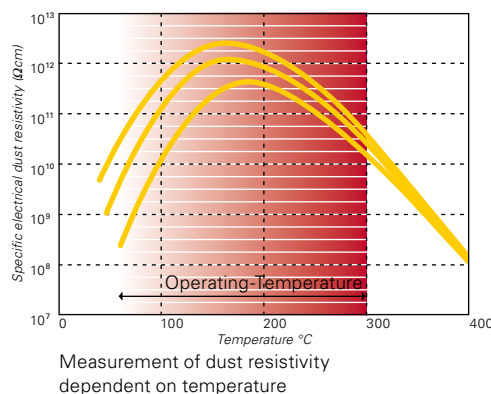
In principle, the migration velocity is a very important empirical value for sizing, and with its help the efficiency of the dust removal can be calculated.

$$w = \frac{-V}{NF} \times \ln(\epsilon)$$

The "Deutsch" formula used to calculate migration velocity

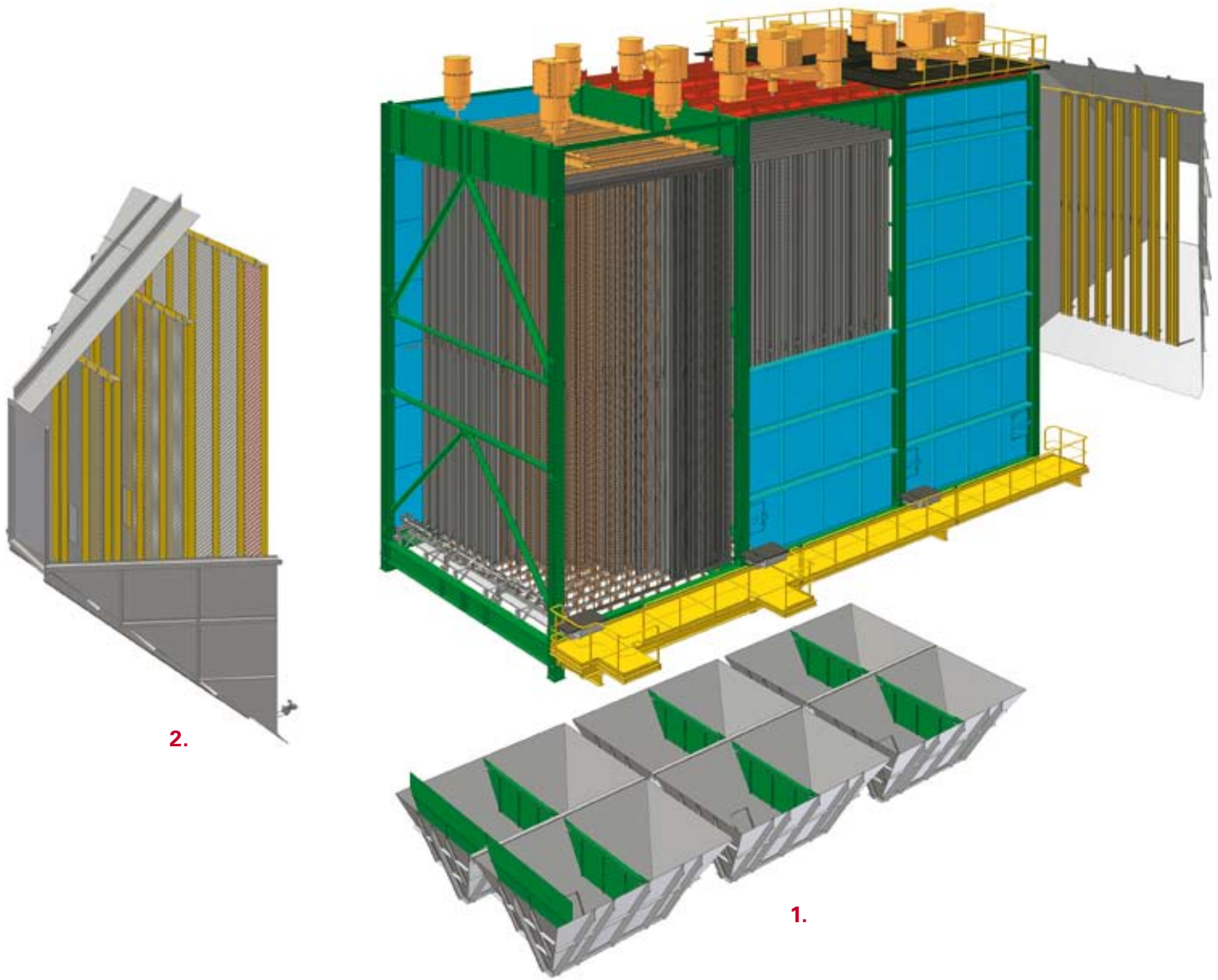
**w** = migration velocity  
**V** = gas velocity  
**NF** = filter size  
**ε** = efficiency

The electrical resistivity of the dust is one of the most critical values. It is primarily material-dependent and in most cases changes by several orders of magnitude depending on the temperature and humidity.

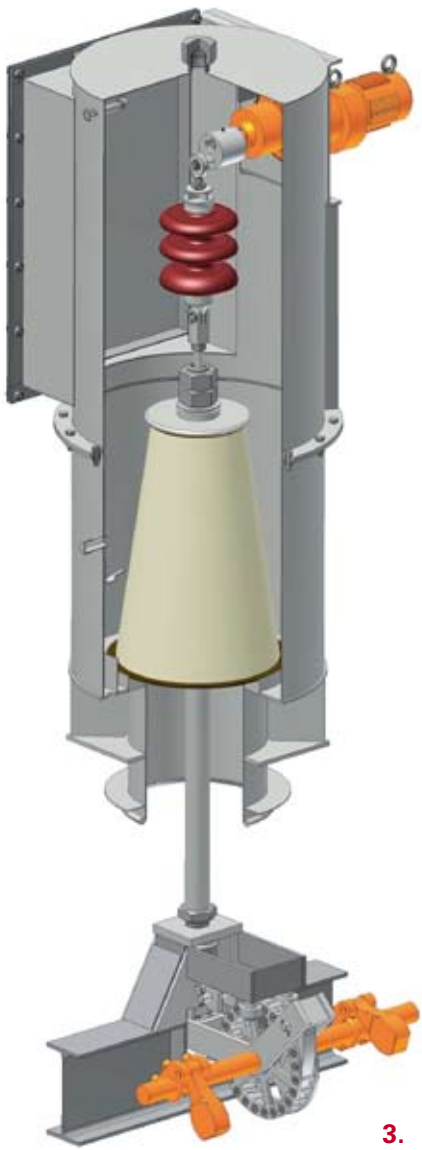


**Important factors which – to some extent – exercise a mutual influence on the parameters determining migration velocity:**

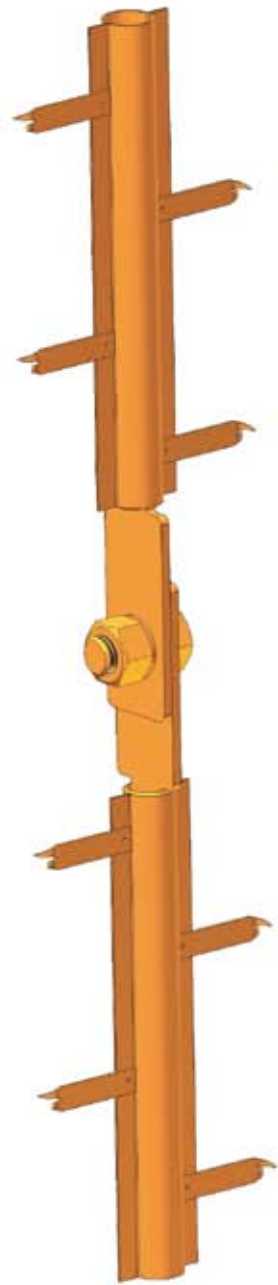
- › Electrical resistivity of the dust
- › Dust content at the precipitator inlet
- › Dust content at the precipitator outlet
- › Grain size
- › Chemical composition of the dust
- › Gas analysis
- › Gas temperature
- › Gas humidity
- › Gas velocity



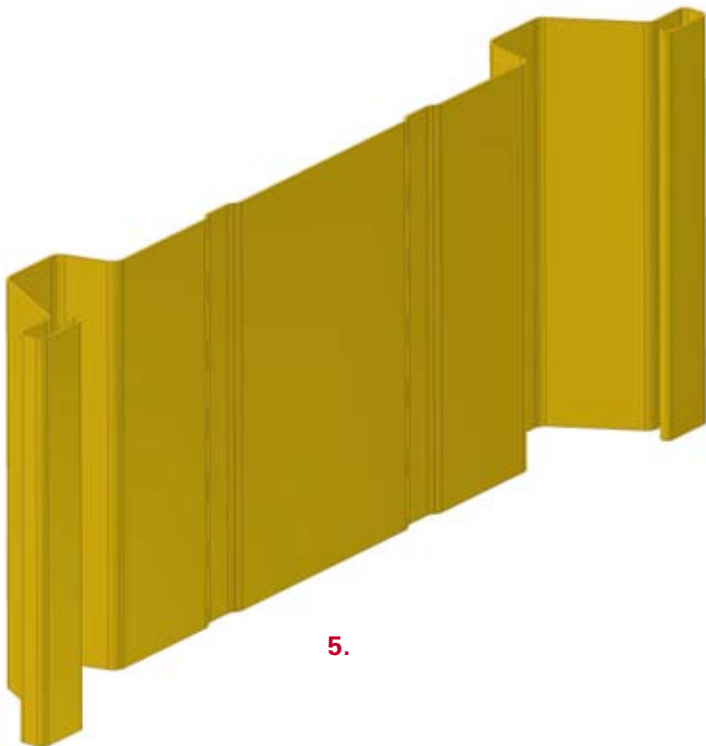
1. Dust collection hopper
2. Gas inlet with gas distribution
3. Discharge electrode rapping
4. Discharge electrode
5. Collecting electrode
6. Collecting electrode rapping



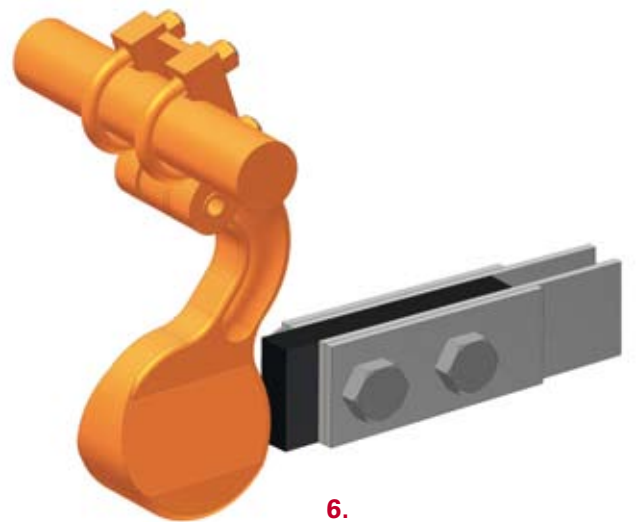
3.



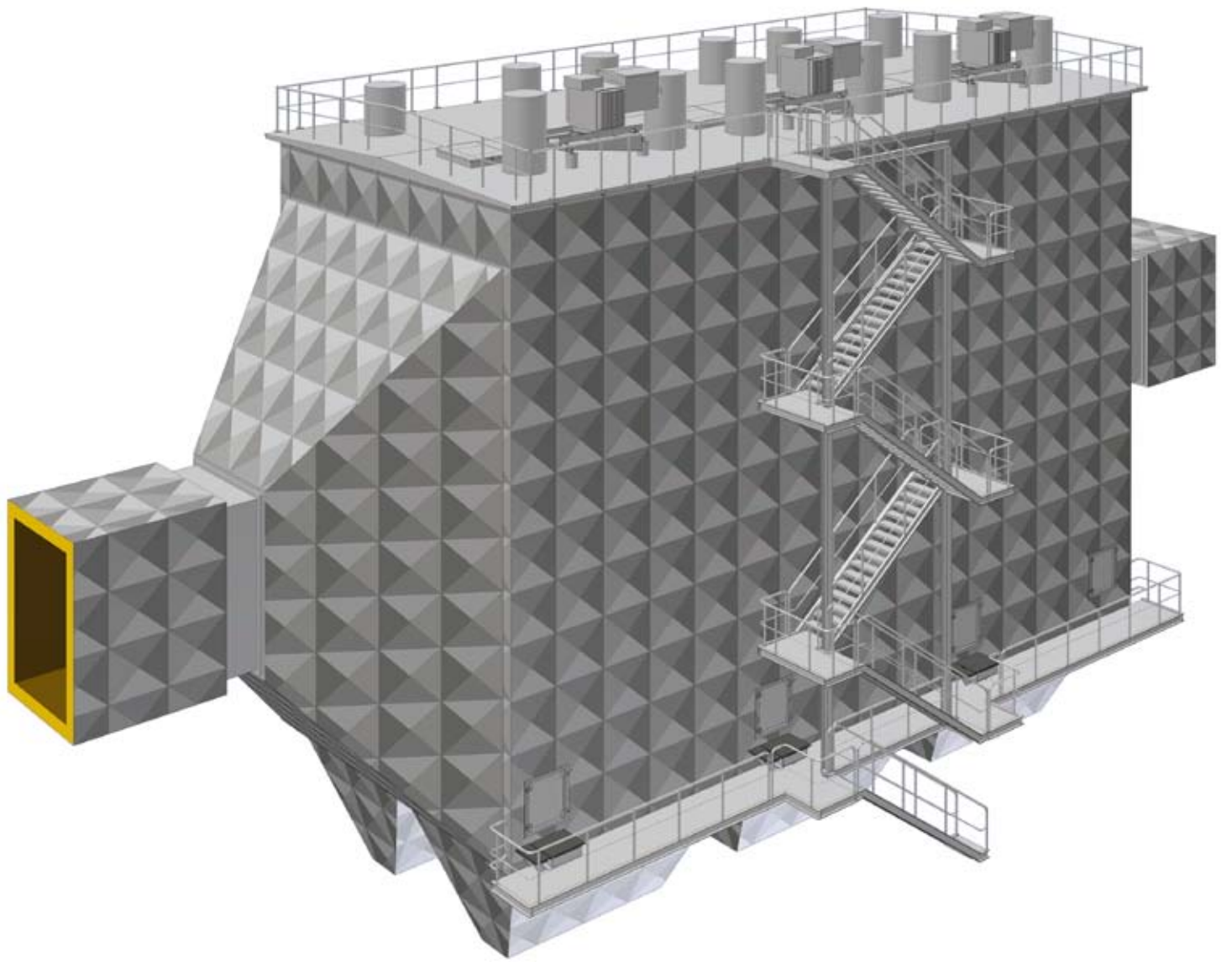
4.



5.



6.



## Safety and trouble-free operation thanks to the best electrical components

A chain is as strong as its weakest link. In order to do justice to the high demands ELEX makes on its installations, we only use quality components. Our precise knowledge of optimal sizing ensures that costs remain stable.

### The most important electro-technical components:

- › Microprocessor-controlled high-voltage rectifier
- › Control cabinet with automatic voltage control and thyristor with current-limiting reactor for:
  - › Accurate recording of signal values, i.e. rapid and refined diagnosis of sparks and arcs
  - › Control of signal values such that optimal suitability of the power supply to the continually changing electrical demands is guaranteed
  - › Modulation of one or several half-waves for the purpose of high dust resistance and/or saving energy
  - › Easy-to-understand failure diagnosis
  - › Simple adaptation to new operating conditions
- › Hand-operated HT-disconnecting switches and, for certain applications, electro-magnetically or pneumatically operated fast-response earth switches (These components can be located with the high-voltage equipment in the HV room or on the roof of the precipitator)
- › Low-voltage switch-gear cabinet for the auxiliary equipment (e.g. rapping mechanisms, insulators, and hopper heating and dust-conveying equipment)

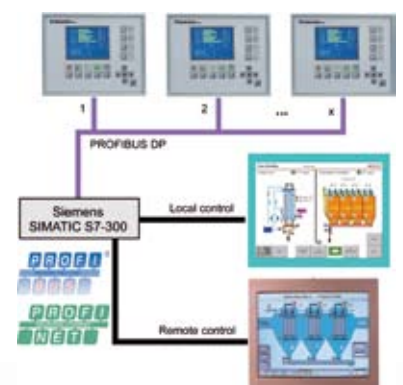
Individually controllable controls (so-called SPS) ensure an efficient connection to the microprocessor-controlled high-voltage equipment.



High-voltage control cabinets with microprocessor controls



High-voltage rectifier



Connection of high-voltage control cabinets by means of bus systems



**A cross-section from our list of more than 6,000 installed electrostatic precipitators and satisfied customers**

As a new customer, we look forward to demonstrating to you our capability and reliability.



**CEMENT WORKS, Germany**  
**PREHEATER KILN – MILL**



**DETARRER, India**



**REFUSE INCINERATOR,**  
Switzerland





**Mixed Sources**  
Product group from well-managed  
forests, controlled sources and  
recycled wood or fiber

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**ELEX AG, ESCHENSTRASSE 6, 8603 SCHWERZENBACH, SWITZERLAND  
PHONE +41 44 825 78 78, FAX +41 44 825 79 79, WWW.ELEX.CH**

